$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$P_1 \rightarrow$ initial pressure

$P_2 \rightarrow$ final pressure

$V_1 \rightarrow$ initial volume

$V_2 \rightarrow$ final volume

$T_1 \rightarrow$ initial temperature

$T_2 \rightarrow$ final temperature

#2) $P_1 = 0.98 \text{ atm}$

$V_1 = 1.0 \text{ L}$

$V_2 = 2.0 \text{ L}$

$P_2 = ?$

$T_1, T_2 \rightarrow$ constant (Boyle's)

$$\frac{P_1 V_1}{\cancel{T_1}} = \frac{P_2 V_2}{\cancel{T_2}}$$

(1)

$$P_1 V_1 = P_2 V_2$$

$$P_2 = \frac{P_1 V_1}{V_2}$$

$$= \frac{(0.98 \text{ atm})(1.0 \cancel{\text{L}})}{(2.0 \cancel{\text{L}})}$$

$$= 0.49 \text{ atm}$$

(2) (1)

#3) $P_1 = 4.5 \text{ atm}$

$T_1 = 325 \text{ K}$

$P_2 = ?$

$T_2 = 500 \text{ K}$

$$\frac{P_1 \cancel{V_1}}{T_1} = \frac{P_2 \cancel{V_2}}{T_2}$$

Volume constant

Gay-Lussac

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$P_2 = \frac{P_1 T_2}{T_1}$$

$$= \frac{(4.5 \text{ atm})(500 \cancel{\text{K}})}{325 \cancel{\text{K}}}$$

$$= 6.92 \text{ atm}$$

#6) $T_1 = 314\ K$

$V_1 = 0.67\ L$

$T_2 = ?$

$V_2 = 1.12\ L$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

Pressure constant

Charles' Law

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$T_2 = \frac{V_2 T_1}{V_1}$$

$$= \frac{(1.12\ L)(314\ K)}{(0.67\ L)}$$

$$= 524.89\ K$$